CLAIMS

Having thus described the preferred embodiments, the invention is now claimed to be:

1.   A magnetic resonance imaging apparatus (10) in which a fixed field of view (FOV) is defined in which magnetic resonance is excited and phase and frequency are encoded, the apparatus including:

a plurality of fixed global receive coils (26a, 26b, 26c) for receiving resonance signals from the fixed field of view (FOV);

a means (28, 30) for moving a subject continuously through the fixed field of view during the excitation, phase and frequency encoding of magnetic resonance and the reception of the magnetic resonance, such that each of the fixed global receive coils (26a, 26b, 26c) receives resonance signals from the subject over an elongated virtual field of view (vFOV), longer than the fixed field of view (FOV);

a means (42) for generating coil sensitivity patterns from static reference acquisitions corresponding to the fixed field of view for the fixed global receive coils (26a, 26b, 26c); and

a means (46) for mapping the sensitivity patterns from the fixed field of view (FOV) corresponding to the global receive coils to the virtual field of view (vFOV).

2.   The magnetic resonance imaging apparatus according to claim 1, further including:

a folded image reconstruction means (50) for reconstructing undersampled resonance signals from the global receive coils acquired during the continuous movement into corresponding folded image representations (52); and

a SENSE reconstruction means (54) for combining and unfolding the folded image representations in accordance with the virtual field of view sensitivity patterns (48) into a virtual field of view image representation (60).

3.   The magnetic resonance imaging apparatus according to claim 1, further including:

a folded image reconstruction means **(50)** for reconstructing the k-space resonance signals corresponding to the global receive coils into corresponding folded image representations **(52)**;

a means **(42)** for reconstructing fully sampled central regions of k-space into additional sensitivity patterns **(44)** in the field of view **(FOV)** corresponding to each of the global receive coils during the continuous movement;

the mapping means **(46)** for mapping the additional sensitivity patterns **(44)** from the fixed field of view into the virtual field of view **(vFOV)**; and

a SENSE reconstruction means **(54)** for unfolding and combining the folded image representations in accordance with the sensitivity patterns mapped into the virtual field of view **(vFOV)**.

4.   The magnetic resonance imaging apparatus according to claim 2, further including:

a plurality of receivers **(26a, 26b, 26c)** each connected with a corresponding one of the global receive coils **(24a, 24b, 24c)**.

5.   The magnetic resonance imaging apparatus according to claim 2, further including:

a sequence control processor **32** for, during the continuous motion, repeatedly causing the generation of magnetic resonance data along a k-space trajectory which passes through central and high frequency regions of k-space.

6.   A method of magnetic resonance imaging comprising:

acquiring data with a plurality of global receive coils which are fixed with respect to a field of view through which a subject can move continuously such that magnetic resonance signals can be acquired over a virtual field of view defined by an elongated region of the subject which is moved through the fixed field of view during the continuous motion and data acquisition;

generating sensitivity patterns corresponding to the fixed field of view for the global receive coils; and

mapping the sensitivity patterns from the fixed field of view to the virtual field of view.

7.   The method according to claim 6, further including:

receiving undersampled resonance data with the plurality of global receive coils as the subject moves continuously through the fixed field of view;

reconstructing the undersampled magnetic resonance data into folded image representations; and

combining and unfolding the folded image representations in accordance with the sensitivity pattern mapped into the virtual field of view.

8.   The method according to claim 7, further including:

repeatedly generating magnetic resonance data along a k-space trajectory which repeatedly passes through low spatial sampling frequencies.

9.   The method according to claim 8, wherein the sensitivity pattern mapped into the virtual field of view corresponding to magnetic resonance data when the trajectory crosses a center of k-space is used in conjunction with all magnetic resonance data of the corresponding k-space trajectory.

10.   The method according to claim 8, wherein the k-space data is acquired in a linear k-space trajectory starting at one high frequency extreme and passing through a central region of k-space to the other high frequency extreme.

11.   The method according to claim 8, wherein the k-space data is acquired along k-space trajectories extending between a central region of k-space and high frequency extremes of k-space alternately.

12.   The method according to claim 8, wherein k-space data is undersampled by each global receive coil at least in high frequency regions and further including:

at least periodically fully sampling k-space data adjacent a low frequency region of k-space; and

updating and remapping the sensitivity patterns in accordance with the fully sampled low frequency k-space regions.

13.   The method according to claim 8, wherein the subject moves continuously through the fixed field of view in a longitudinal direction and further including:

exciting and frequency encoding magnetic resonance parallel to the longitudinal direction of motion; and

phase encoding the magnetic resonance perpendicular to the longitudinal direction.

14.   The method according to claim 13, wherein the imaging sequence includes generating fast field echoes.

15.   The method according to claim 8 further including:

collecting at least low frequency spatial frequency data in static acquisitions at a plurality of locations along the subject in a direction of the continuous motion;

generating additional sensitivity patterns in the fixed field of view corresponding to each of the locations; and

mapping the additional sensitivity patterns to the virtual field of view.

16.   The method according to claim 15, wherein each generated sensitivity pattern in the fixed field of view corresponds to one of the k-space trajectories.

17.   The method according to claim 16, wherein the locations at which the at least low spatial frequency data is collected are spaced by a distance commensurate with a distance that the subject moves during the corresponding k-space trajectories.

18.   A magnetic resonance imaging scanner including a main magnet (12) for generating a spatially constant magnetic field through the examination region (14),

an RF system (20, 22, 24, 26) for exciting, manipulating, and acquiring magnetic resonance signals, and a gradient magnetic field system (16, 18) for creating magnetic field gradients across the examination region, and further including:

a processor (32, 40) for performing the method of claim 6.